Some New Gastropod Representatives from the Brackish Waters of the Adriatic and Aegean Seasides

BY

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(2 Plates; 3 Text figures)

THE COASTAL REGION along the Yugoslav part of the Adriatic Sea is relatively narrow, separated from the continental part of the Balkan Peninsula by the high mountain chain of the Dinarides. Yet in this narrow zone a number of rather large rivers with relatively long courses has been formed. The extreme lower courses of these rivers contain brackish water, and around the mouth of each of them a more or less extensive brackish zone exists, depending upon the quantity of fresh water in the river and upon some other factors.

A specific fauna inhabits these brackish waters. When the brackish water gastropods from this area are considered, one usually mentions several species of the genus *Hydrobia*, which subject I will discuss on another occasion. This time I wish to describe two new brackish water genera with five species, about whose representatives I could not find any data in the malacological literature. I suppose that previous investigators, who studied the malacological material from these waters, probably considered these species members of the above mentioned genus.

Semisalsa Radoman, gen. nov.

Shell conical, elongated, with moderately pointed apex, in younger specimens smooth, shining and transparent; moderately tumid whorls, separated by a rather deep suture, gradually and regularly expanding in width. Aperture usually angular at the top, in rare specimens slightly round (at the top), but very narrow. The margins of the aperture thin, peristome discontinuous, with columellar margin applied to the last whorl so that this margin often is seen as a callus; outer lip gently curved, umbilicus closed, in rare cases (in the same species) barely slitlike.

Central tooth of the radula with 2 to 4 basal cusps. Stomach without a caecal tube-shaped appendix on its anterior, oesophageal end (Figures 3A and 3B), characteristic for the genus *Hydrobia*.

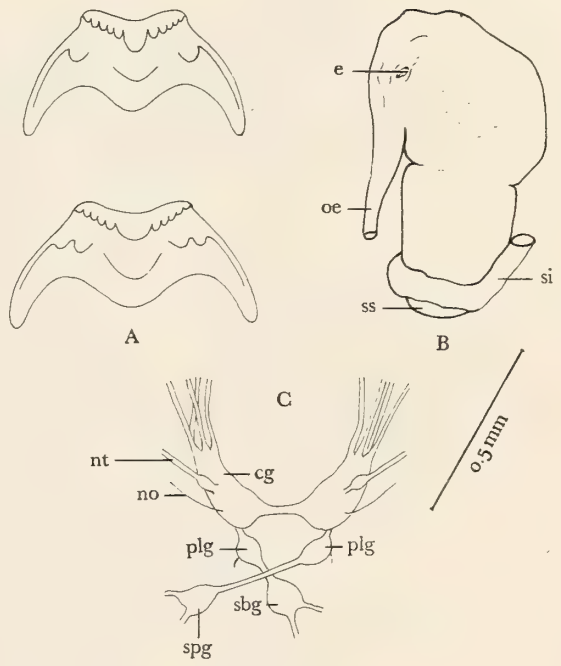

Figure 3

Semisalsa dalmatica Radoman, spec. nov.
A: Central tooth of radula; B: Stomach; C: Nervous system
cg – cerebral ganglion e – entrance of the duct from the digestive gland ("liver") no – nervus opticus oe – oesophagus plg – pleural ganglion sbg – subintestinal ganglion
si – small intestine spg – supraintestinal ganglion
ss – style sac

Nervous system (Figure 3C) with a relatively long cerebral commissure, clearly perceptible cerebro-pleural connectives, long pleuro-supraintestinal and shortened but clearly differentiated pleuro-subintestinal connective; a ganglionic thickening is present on the tentacle nerve and absent from the lateral pedal nerve; pro- and meta-podial ganglia moderately developed.

Female reproductive system (Figures 4B and 4C) is very characteristic: a small, pin-shaped genital chamber with a long duct is present and, also with a long duct, only 1 seminal receptacle, applied to the genital chamber. The oviduct in a "loop" is widened, making 2 to 3 whorls, and continues in a short terminal part penetrating into the accessory gland by which this genus is essentially differentiated from the genera *Hydrobia, Pyrgula* and their relatives (Radoman, 1955). The female accessory gland, terminating at the genital pore, exhibits 4 colour nuances, which means that this gland is constituted of 4 parts, which broadly communicate with each other: the first is whitish, the second "glassy" ("colourless"), the third shows the most expressive character of the genus – in the fresh state it is the colour of "terracotta" and in material

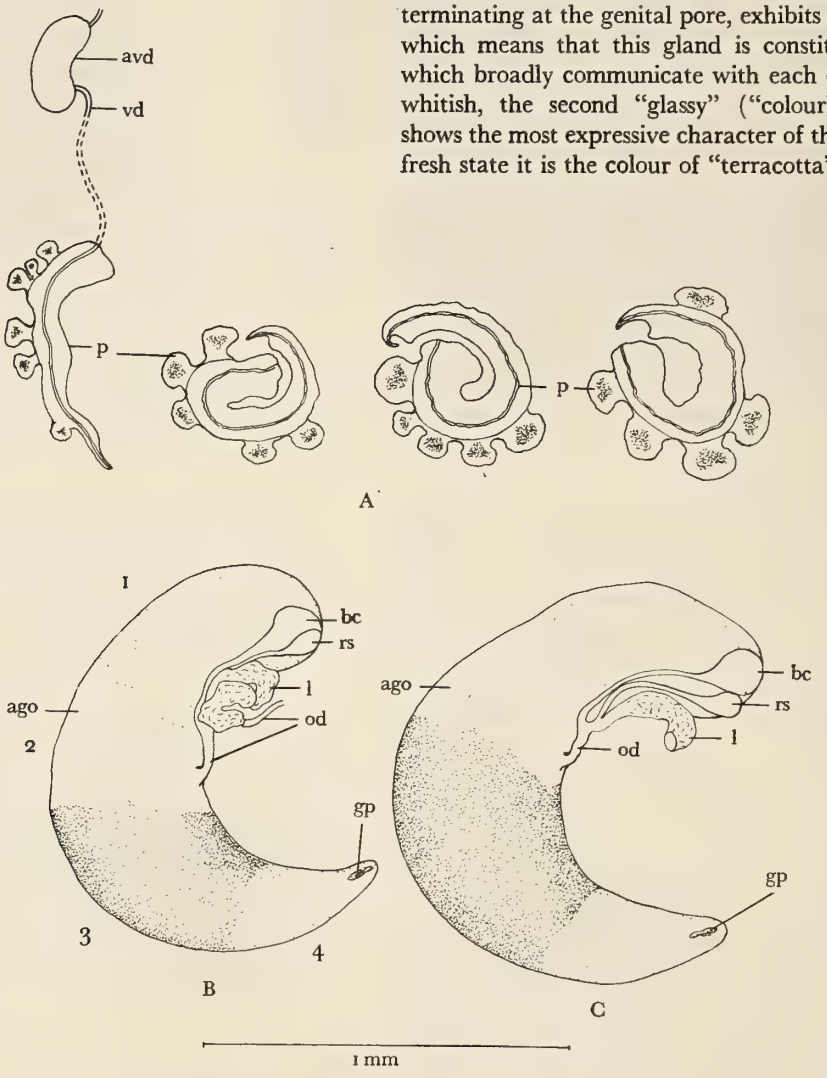

Figure 4

Semisalsa dalmatica Radoman, spec. nov.

A: Male reproductive system (without seminal gland); B: Female reproductive system (without ovary) in natural position, showing 4 colour nuances. 1 – whitish; 2 – "glassy"; 3 – "terracotta"; 4 – white

C: the same parts partially dissected: ago - accessory gland of oviduct avd - accessory gland of vas deferens bc - bursa copulatrix gp - gonopore l - loop of oviduct od - oviduct p - penis rs - receptaculum seminis vd – vas deferens

preserved in alcohol for a long time, this colour changes to reddish-yellowish (Figures 4B and 4C). Due to this colouring this relatively big gland can be observed through the transparent shell and on that basis the females can be separated from the males. The terminal, fourth part of the accessory gland is white.

The male accessory gland is small (Figure 4A). The penis is very characteristic (Figure 4A): it is elongated, with a pointed end and with 5 outgrowths on the right side (the second one sometimes is double).

Type species: ***Semisalsa dalmatica*** Radoman, spec. nov.

Etymology: the name of the genus is derived from the brackish water (semi-salsus = semi-salt) in which all representatives of this genus, known up to now, live.

I have found 3 species of this genus which will be here briefly comparatively described.

Semisalsa dalmatica Radoman, spec. nov.

Shell (Figure *1*A), in relation to that of other species, mostly elongated and slenderest, with a few more whorls (see Table 1).

Measurements: in Table 1

Type Locality: brackish water spring Pirovac, near the small town of the same name, by the main road Zadar-Šbenik, Yugoslavia; in addition to Pirovac spring also found in lower brackish course of the Zrmanja river, near the town Obrovac, and in the brackish Cetina river, 2 to 3 km from the town Omiš, also in Yugoslavia.

Holotype: Prirodnjački Muzej, Beograd (PMB, Museum of Natural History, Beograd) 7997/1; collected in July 1972 by Pavle Radoman

Paratypes: PMB 7997/2 (4); same data as for the holotype

Semisalsa rausiana Radoman, spec. nov.

This is the smallest of the 3 species, its shell (Figure *1*B) having the smallest number of whorls and its aperture, in proportion to the shell length, being the highest one.

Measurements: in Table 1

Type Locality: brackish part of Rijeka dubrovačka (Dubrovnik River) near Dubrovnik, Yugoslavia.

Etymology: this species is named after the old Roman name of Dubrovnik – Rausium.

Holotype: Prirodnjački Muzej, Beograd (PMB) 7998/1; collected in July 1968 by Pavle Radoman

Paratypes: PMB 7998/2 (3); same data as for the holotype

Semisalsa graeca Radoman, spec. nov.

The height of the shell (Figure *1*C) is nearly the same as in the type species, yet on the average somewhat smaller, with fewer whorls, proportionately larger, with relatively higher aperture (in proportion to the shell length) than in the type species.

Measurements: in Table 1

Type Locality: brackish water spring Tramana (?or Tratana), near the town of the same name, close to the main road Larissa-Athens, about 120 km north of Athens, Greece.

Holotype: Prirodnjački Muzej, Beograd (PMB) 7999/1; collected in July 1964 by Pavle Radoman

Paratypes: PMB 7999/2 (3); same data as for the holotype

Table 1

	shell		aperture		number
	length	width	length	width	of whorls
Semisalsa dalmatica	3.2 - 4.4	1.6 - 1.9	1.2 - 1.5	0.9 - 1.2	$5\frac{1}{2}$ - $6\frac{1}{4}$
Semisalsa rausiana	2.6 - 3.1	1.3 - 1.6	1.1 - 1.2	0.8 - 0.9	$4\frac{3}{4}$ - 5
Semisalsa graeca	3.1 - 4.2	1.6 - 2.1	1.2 - 1.6	1.0 - 1.2	$5\frac{1}{4}$ - 6

Obrovia Radoman, gen. nov.

Shell conical, with moderately pointed apex; moderately tumid whorls, separated by a rather deep suture, regularly expanding in width. Aperture egg-shaped, narrowed, almost angular at the top. The margins of the aperture rather thickened, especially the columellar one; outer lip vertical, peristome continuous. Umbilicus slit-like.

Central tooth of the radula with 2 basal cusps, and each tooth, except to a certain extent the second marginal one, provided with a small number of little teeth. Stomach with a caecal tube-shaped appendix on the oesophageal end (Figure 5).

The nervous system as in *Hydrobia*: long pleuro-supraintestinal and very shortened pleuro-subintestinal connective, so that these latter 2 ganglia are almost grown together; a ganglionic thickening present on the tentacle nerve, absent from the lateral pedal nerve.

The accessory part of the female reproductive system is characterized by the presence of a pear-shaped genital chamber, protruding behind the posterior part of the accessory gland, with a long duct (Figures 6A and 6B). Black pigmented oviduct in the "loop", after separation of the gono-pericardial duct, is moderately widened (as in *Hydrobia*) and proportionally very long, making several whorls; after that the oviduct continues in an almost straight, not pigmented terminal part of the same width, receiving at the beginning, before the duct of the genital chamber, a rather long duct of the seminal receptacle, and terminating with a genital pore.

Male accessory gland of moderate size; a characteristic flattened penis is present, without any conspicuous outgrowths, with an enlarged, "bubble-like" and turned to the left end (Figure 6C).

Type species: ***Obrovia salaria*** Radoman, spec. nov.

Etymology: This genus is named for the town Obrovac on the Zrmanja river.

By the form of the shell as well as by its anatomy, this genus undoubtedly is related to the genus *Hydrobia,* yet anatomically clearly different from it by the following features: in *Hydrobia* the genital chamber is large, more extensive, the oviduct in the "loop" much shorter, the penis is longer and pointed, with an outgrowth on the middle of the left side (*cf.* KRULL, 1935; RADOMAN, 1955).

Up to now I have found 2 species of this genus which live sympatrically in the brackish part of the river Zrmanja near the town of Obrovac.

Obrovia salaria Radoman, spec. nov.

Shell (Figure 2A) regularly conical, with slightly more tumid whorls and deeper suture than in the next species. Sexual dimorphism of the shells: the females are larger than the males.

Measurements: in Table 2

Table 2

		shell		aperture		number
		length	width	length	width	of whorls
Obrovia salaria	females	3.8 - 4.7	1.8 - 2.1	1.3 - 1.5	1.1 - 1.3	$6\frac{1}{2}$ - $7\frac{1}{2}$
	males	3.3 - 3.6	1.3 - 1.6	1.0 - 1.2	0.8 - 1.0	$5\frac{1}{2}$ - $6\frac{1}{2}$
Obrovia testadura		3.3 - 4.2	1.6 - 2.0	1.2 - 1.4	0.9 - 1.1	6 - $6\frac{1}{2}$

Explanation of Figure *1*

Figure *1*: (A) ***Semisalsa dalmatica*** Radoman, spec. nov.; (B) ***Semisalsa rausiana*** Radoman, spec. nov.; (C) ***Semisalsa graeca*** Radoman, spec. nov.

Explanation of Figure *2*

Figure *2*: (A) ***Obrovia salaria*** Radoman, spec. nov.; (B) ***Obrovia testadura*** Radoman, spec. nov.


A
B
C